WHAT IS CLAIMED IS:

- 1. A system for neutralizing airborne pathogens, comprising:
- 2 A. a flow-through reaction chamber having:
- 1. a chamber air inlet at a first end of the reaction chamber to admit air contaminated with pathogens, and
- 2. a chamber air outlet at a second end of the reaction chamber to release decontaminated air, and defining between the air inlet and air outlet a passageway,
- B. a supply of aqueous hydrogen peroxide connected to a conduit for introducing aqueous hydrogen peroxide into the reaction chamber, and
- 10 C. an ultraviolet light source for introducing UV light into the reaction chamber.
- 1 2. The system as in claim 1, wherein the supply of aqueous hydrogen peroxide is a
 2 hydrogen peroxide generator connected to a water supply and a source of electricity.
- 1 3. The system as in claim 1, wherein the supply of aqueous hydrogen peroxide is a reservoir of aqueous hydrogen peroxide.
- 1 4. The system as in claim 1, wherein the conduit is a nozzle disposed inside the reaction chamber.
- 1 5. The system as in claim 1, wherein the reaction chamber further comprises a porous matrix.
- 1 6. The system as in claim 5, wherein the porous matrix is metal foam.
- 1 7. The system as in claim 6, wherein the metal is selected from the group comprising aluminum, copper, silver, and oxides thereof.
- 1 8. The system as in claim 6, wherein the metal foam is aluminum foam.

- 1 9. The system as in claim 5, wherein the porous matrix is removable.
- 1 10. The system as in claim 1, further comprising a microwave generator to introduce
- 2 microwaves into the reaction chamber.
- 1 11. The system as in claim 1, further comprising an ultrasonic wave generator to
- 2 introduce ultrasonic waves into the reaction chamber.
- 1 12. The system as in claim 1, further comprising an ozone supply for introducing ozone
- 2 into the reaction chamber.
- 1 13. The system as in claim 12, wherein the ozone supply is an ozone generator.
- 1 14. The system as in claim 12, wherein the ozone supply is a reservoir that contains
- 2 ozone.
- 1 15. The system of claim 12, further comprising a mixing chamber for mixing ozone and
- 2 aqueous hydrogen peroxide.
- 1 16. The system of claim 1, wherein the reaction chamber further comprises a solid
- 2 support.
- 1 17. The system of claim 16, wherein the solid support comprises ozone removal catalysts.
- 1 18. The system of claim 16, wherein the solid support comprises compounds that adsorb
- 2 or neutralize pathogens.
- 1 19. The system of claim 16, wherein the solid support comprises compounds that adsorb
- 2 or neutralize chemical toxins.
- 1 20. The system of claim 19, wherein the solid support comprises ozone removal catalysts.

1	21.	The system of claim 17,	wherein the ozone removal	l catalyst is a member selected
---	-----	-------------------------	---------------------------	---------------------------------

- 2 from the group comprising all-aluminum catalysts, a carbon supported metal oxide
- 3 catalyst, CuCl₂-coated carbon fibers, carbon-iron aerosol particles, alumina, platinum,
- 4 palladium, and nickel.
- 1 22. The system of claim 13, wherein the ozone generator is a corona discharge generator.
- 1 23. The system as in claim 1, configured for operation in a continuous mode.
- 1 24. The system as in claim 1, configured to be activated upon demand.
- 1 25. The system of claim 1, further comprising a fan to move air through the passageway.
- 1 26. The system of claim 1, wherein an amount of hydrogen peroxide in the reaction
- 2 chamber is controlled by sensors.
- 1 27. The system as in claim 1, wherein the ultraviolet light source emits high intensity UV
- 2 light.
- 1 28. The system as in claim 27, wherein the ultraviolet light source emits UV light having
- a wavelength in a range from about 250 nanometers to about 300 nanometers.
- 1 29. The system of claim 1, wherein a concentration of hydrogen peroxide in the aqueous
- 2 hydrogen peroxide supply is from about 1 % to about 50%.
- 1 30. The system as in claim 1, wherein a concentration of hydrogen peroxide in the
- aqueous hydrogen peroxide supply is from about 1 % to about 25%.
- 1 31. A method of neutralizing airborne pathogens comprising:
- 2 1. introducing air contaminated with pathogens into a flow-through reaction
- 3 chamber;

4		2.	introducing aqueous hydrogen peroxide into the flow-through reaction	
5			chamber to form a mixture of contaminated air and aqueous hydrogen	
6	-	•	peroxide inside the reaction chamber;	
7		3.	irradiating the mixture with ultraviolet light thereby neutralizing the airborne	
8			pathogens to create decontaminated air; and	
9		4.	releasing the decontaminated air from the reaction chamber.	
1	32.	The m	The method of claim 31, further comprising the additional step before step 3 of	
2		introd	ucing ozone into the reaction chamber forming a mixture of contaminated air,	
3		aqueo	us hydrogen peroxide and ozone.	
1	33.	The method of claim 31, step 2 further comprising mixing the aqueous hydrogen		
2		peroxide with ozone before introducing the aqueous hydrogen peroxide to form a		
3		mixtur	re of contaminated air, aqueous hydrogen peroxide and ozone.	
1	34.	The m	ethod of claim 31, step 2 further comprising introducing the aqueous hydrogen	
2		peroxi	de into the reaction chamber through a nozzle disposed in the reaction	
3			er, to form at least one of a spray, mist or vapor.	

The system as in claim 31, step 2 further comprising maintaining a concentration of 36. 1

The method as in claim 31, step 2 further comprising maintaining a concentration of

hydrogen peroxide in the flow through reaction chamber at a level in a range from

- hydrogen peroxide in the flow-through reaction chamber at a level in a range from 2
- 3 about 1% to about 25%.

about 1% to about 50%.

1

2 3 35.

- The method as in claim 32, step 2 further comprising maintaining a concentration of 37. 1
- ozone in the reaction chamber at a level in a range from about 0.01 ppm to about 100 2
- 3 ppm.

1	38.	A method of neutralizing airborne chemical toxins comprising:
---	-----	---

- introducing air contaminated with chemical toxins into a flow-through reaction chamber;
- introducing aqueous hydrogen peroxide into the flow-through reaction chamber to form a mixture of contaminated air and aqueous hydrogen peroxide inside the reaction chamber;
- irradiating the mixture with ultraviolet light thereby neutralizing the airborne chemical toxins to create decontaminated air; and
- 9 4. releasing the decontaminated air from the reaction chamber.
- The method of claim 38, further comprising the additional step before step 3 of introducing ozone into the reaction chamber to form a mixture of contaminated air, aqueous hydrogen peroxide and ozone.
- The method of claim 38, step 2 further comprising mixing the aqueous hydrogen peroxide with ozone before introducing the aqueous hydrogen peroxide to form a mixture of contaminated air, aqueous hydrogen peroxide and ozone.
- The method of claim 38, step 2 further comprising introducing the aqueous hydrogen peroxide into the reaction chamber through a nozzle to form at least one of a spray, mist or vapor.
- The method as in claim 38, step 2 further comprising maintaining a concentration of hydrogen peroxide in the flow through reaction chamber at a level in a range from about 1% to about 50%.
- The system as in claim 38, step 2 further comprising maintaining a concentration of hydrogen peroxide in the flow-through reaction chamber at a level in a range from about 1% to about 25%.

The method as in claim 32 or claim 33, step 2 further comprising maintaining a concentration of ozone in the reaction chamber at a level in a range from about 0.01 ppm to about 1000 ppm.

- The method as in claim 32 or claim 33, step 2 further comprising maintaining a concentration of ozone in the reaction chamber at a level in a range from about 0.01 ppm to about 1000 ppm.
- 1 46. A system for neutralizing airborne pathogens and chemical toxins, comprising:
- 2 A. a flow-through reaction chamber having:
- a chamber air inlet at a first end of the reaction chamber to admit air contaminated with pathogens, and
- a chamber air outlet at a second end of the reaction chamber to release decontaminated air, and defining between the air inlet and air outlet a passageway,
- B. a supply of aqueous hydrogen peroxide connected to a conduit for introducing aqueous hydrogen peroxide into the reaction chamber, and
- 10 C. a means for converting aqueous hydrogen peroxide to hydroxyl radicals.
- 1 47. The system as in claim 46, wherein the means for converting aqueous hydrogen peroxide into hydroxyl radicals is heat.
- 1 48. The system as in claim 46, wherein the means for converting aqueous hydrogen
- 2 peroxide into hydroxyl radicals is electricity.